

by the prevalence of respiratory disease at birth from other causes, particularly in those born prematurely.

The diagnosis of pulmonary hypoplasia should be based on the measurement of lung volume and the exclusion of other pathology which can cause tachypnoea, such as congenital heart disease, obstructive lung disease, interstitial lung disease, and infection. Several different techniques are available for the measurement of lung volumes in infants⁹ and measurement should ideally be undertaken in laboratories used to performing these tests. In case 1 functional residual capacity was assessed by whole body plethysmography. This measures all the air present in the chest including that contained in non-ventilated alveoli (and also a small amount of intra-abdominal air). Values are therefore higher than those obtained from measurement of functional residual capacity by inert gas dilution, where only the volume of the lung taking part in gas exchange is measured. Measurement of functional residual capacity by gas dilution can therefore underestimate lung volume in the presence of airways obstruction. None of the babies described here had wheezing on auscultation.

All of the children had chest x ray pictures taken which were reported by radiologists as normal, except the first x ray in case 1, described as being consistent with transient tachypnoea of the newborn. It is important to remember, however, that the possibility of pulmonary hypoplasia had not been raised by the clinicians when these examinations were performed and that chest radiography is a relatively insensitive method of diagnosing pulmonary hypoplasia.

Of interest is that two of these infants (cases 1 and 2) were the children of doctors. Perhaps parental concerns about persistent tachypnoea were taken more seriously because of this?

Little is known about the prognosis of babies with pulmonary hypoplasia: long term follow up studies have been performed on only a few babies with diaphragmatic hernia, in whom important lung

function abnormalities are still evident many years later.^{10,11}

Persistent respiratory morbidity has also been described in infants born after prolonged premature rupture of the membranes during pregnancy.¹² The infants reported here were not severely ill in the neonatal period and showed good "catch up" lung growth in relation to body weight during the first year of life to around the lower end of the normal range of values. It may be important to identify children with this condition, which might be more common than previously thought, as it is not yet known whether they are at increased risk of respiratory problems later in life.

Funding: Dr Aiton is supported by the Special Trustees of St Thomas's Hospital and the Bernard Sunley Charitable Trust Foundation with Tommies' Campaign. Dr Hannam was supported by the Foundation for the Study of Infant Deaths. Dr Fox was supported by Glaxo Ltd.

Conflict of interest: None.

- 1 Stocks J, Quanjer PH. Reference values for residual volume, functional residual capacity and total lung capacity. *Eur Respir J* 1995;8:492-506.
- 2 Mendelsohn G, Hutchins. Primary pulmonary hypoplasia: a report of a case with polyhydramnios. *Am J Dis Child* 1977;131:1220-3.
- 3 Agapitos M, Georgiou-Theodoropoulou M, Koutselinis A, Papacharalambos N. Arthrogryposis multiplex congenita, Pena-Shokeir phenotype, with gastroschisis and agenesis of the leg. *Pediatric Pathol* 1988;8:409-13.
- 4 Ilagan NB, Liang KC, Delaney-Black V, Perrin E. Hydrops fetalis, polyhydramnios, pulmonary hypoplasia, and Down syndrome. *Am J Perinatol* 1992;9:9-10.
- 5 Page DV, Stocker JT. Anomalies associated with pulmonary hypoplasia. *Am Rev Respir Dis* 1982;125:216-21.
- 6 Swischuk LE, Richardson CJ, Nichols MM, Ingman MJ. Primary pulmonary hypoplasia in the neonate. *J Pediatr* 1979;95:573-8.
- 7 Boylan P, Howe A, Gearly J, O'Brien NG. Familial pulmonary hypoplasia. *Irish J Med Sci* 1977;146:179-80.
- 8 Wigglesworth JS, Desai R. Is fetal respiratory function a major determinant of perinatal survival? *Lancet* 1982;i:264-7.
- 9 Polgar G, Promadhat V. *Pulmonary function testing in children: techniques and standards*. Philadelphia: W B Saunders, 1971.
- 10 Dellepoule F, Martinot A, LeClerc F, Riou Y, Remy-Jardin M, Amegassi F, et al. Long term outcome of congenital diaphragmatic hernia (French). *Arch Fr Pediatr* 1991;48:703-7.
- 11 Freyschuss U, Lannergren K, Frenckner B. Lung function after repair of diaphragmatic hernia. *Acta Paediatr Scand* 1984;73:589-93.
- 12 Thompson P, Greenhough A. Chronic respiratory morbidity after prolonged and premature rupture of the membranes. *Arch Dis Child* 1990;65:878-80.

Management of HIV infected health care workers: lessons from three cases

Jill Pell, Laurence Gruer, Peter Christie, David Goldberg

Three cases in which doctors in Glasgow were diagnosed as having HIV infection were all handled differently in relation to telling patients and the media. In the first patients were not told because the doctor had been doing administrative work and there was thought to be no risk to patients; although the media did report the case, it accepted the assurances given. In the second case, where a doctor had done many jobs in different specialities and places, the media identified the doctor before most patients had been informed: most calls to the helpline subsequently set up by the health authority were from patients who had not been treated by this doctor. This episode, however, allowed the incident team to be prepared for the next case, enabling the helpline to be established swiftly. In this case the doctor voluntarily identified himself, and this served to allay public fears and reduce the number of inappropriate calls to the helpline.

The risk of transmission of HIV from an infected health care worker to a patient lies between 1 in 4000 and 1 in 40 000.¹ HIV antibody tests have been

performed on more than 22 000 patients treated by infected health care workers.^{2,3} Although more than 100 patients tested positive, in only one incident was the health care worker, a dentist, implicated as the possible source of infection.²³ The United Kingdom guidelines on the management of HIV infected health care workers encompass three main principles: a duty to protect patients, a duty of confidentiality towards infected health care workers, and the concept that the risk of HIV transmission is restricted to certain "exposure prone" procedures from which infected staff should refrain (see box).⁴⁵ There have been three recent incidents in Scotland involving HIV infected doctors, all in the Glasgow area. The nature and management of these varied. This paper describes our experience and the lessons learnt.

Case 1

In January 1990 a consultant in accident and emergency medicine was admitted with *Pneumocystis carinii* pneumonia. HIV was diagnosed, and he died two weeks later. He had had hepatitis B one year

Department of Public Health, Greater Glasgow Health Board, Glasgow G1 1ET
Jill Pell, senior registrar
Laurence Gruer, HIV and addictions coordinator

Scottish Centre for Infection and Environmental Health, Ruchill Hospital, Glasgow J20 9NB
Peter Christie, consultant epidemiologist
David Goldberg, deputy director and consultant epidemiologist

Correspondence to: Dr Pell.

BMJ 1996;312:1150-3

National guidance on HIV infected health care workers

- Infected health care workers should stop performing exposure prone procedures immediately after diagnosis
- Patients who have undergone an exposure prone procedure when the infected health care worker was the sole or main operator should be notified of this, offered reassurance and counselling, and an HIV test if requested
- If possible letters to patients should be sent so that they arrive before or on the day of the planned press statement
- A dedicated local telephone helpline should be established as soon as possible
- Health care workers have a right to confidentiality, which can be breached only in exceptional circumstances when required in the public interest

earlier. Over the previous 10 years he had worked largely in an administrative capacity, and the procedures he undertook were not thought to have placed his patients at risk. The health board was notified of his diagnosis after his death. A look back exercise was not undertaken; nor was a helpline established. A newspaper named the infected doctor, but his identity was not confirmed. The media and public appeared to accept the reassurances given.

Case 2

In April 1993 a junior doctor developed cerebral toxoplasmosis and was diagnosed as having HIV infection. He had had pulmonary tuberculosis in 1990 and hepatitis B in 1978. Given his poor cognitive state, an incomplete career history was compiled from relatives and personnel records. This included a number of hospital and primary care posts in four areas, as well as locum and deputising posts. He died three weeks after admission. The health board established an incident team. The next day intense media interest began and a press conference was held. The media published a name, and, although this was never confirmed, journalists pursued the doctor's relatives, forcing them to move.

The team decided to contact patients on whom the junior doctor had performed exposure prone procedures. Patients whom he had cared for while doing posts in microbiology, psychiatry, general medicine, gynaecology, and primary care were excluded. Information systems could not identify some accident and emergency patients treated by the doctor. Manual review of case notes enabled letters to be sent to 42 patients who had undergone episiotomy repairs.

A helpline opened on the same day as the press conference. Of the 982 calls received, 78% occurred during the first two days.⁶ Three hundred and ninety nine (41%) callers were patients of the infected doctor, but 511 (52%) were patients of other doctors. Sixty two people requested counselling, including 18 who were not patients of the infected doctor. HIV tests were requested by 15 patients of the infected doctor, including two who had not undergone exposure prone procedures. All tests were negative.

Case 3

A consultant ear, nose, and throat surgeon was admitted with *Pneumocystis carinii* pneumonia in December 1994. Over the previous 10 years he had worked in only two hospitals. He had had hepatitis B in 1974. The media learnt of the incident during the first meeting of the incident team. Therefore a statement was released immediately and a planned press conference brought forward. Before this could be held two newspapers incorrectly identified the infected surgeon. In response the surgeon allowed himself to be identified at the press conference to help in tracing contacts, counter media speculation regarding his colleagues,

and reassure patients. The media reacted positively to his disclosure.

A telephone helpline became operational the same day as the press conference. Of the 580 calls, 92% were made within the first week.⁷ Three quarters of callers were patients of the infected surgeon, and 98% of these had undergone surgery. All 677 patients operated on by the surgeon during the previous 10 years were identified. Record linkage with the General Registrar's database was used to exclude 35 who had subsequently died. The remainder were all contacted by letter. Twenty six patients attended for counselling, and 18 were tested for HIV.⁷ All tests were negative.

In March 1996 the surgeon attended a second press conference before resuming his work. His duties were restricted to outpatient and teaching commitments, and patients were offered a different doctor if they preferred. The response from patients and the media was positive. The surgeon recently applied to the United Kingdom Advisory Panel requesting permission to resume his clinical duties in full.

Discussion

REMIT OF THE INCIDENT TEAM

The incident team should manage both the actual and perceived risk of transmission of HIV to patients. Although the actual risk is extremely low, the anxiety provoked is often high. Ideally the team should collate all the necessary information before deciding on the best course of action, but unplanned disclosure is common. This allows the media to dictate the pace at which incidents are managed and necessitates damage limitation. Responsible media coverage must be encouraged but cannot be guaranteed without tighter regulatory controls.

TELEPHONE HELPLINE

A helpline can reassure both patients and the public by providing information, correcting misconceptions, and answering queries.⁸ It is required once the public becomes aware of an incident. Unplanned disclosure may precede the written notification of patients, making forward planning essential. The experience gained during the second incident was invaluable in enabling the prompt establishment of a helpline for the third. Dedicated telephone lines were already in place and lists of experienced helpline operators available.

CLASSIFYING AND TRACING PATIENTS

The national recommendations require that only patients undergoing exposure prone procedures should be contacted. In practice, however, prompt classification by exposure risk may be problematic.

Main lessons to be learnt

- Unplanned media disclosure is common and should be anticipated
- Forward planning enables a quick response, including early establishment of a telephone helpline
- Prompt identification of patients and categorisation of the risk of exposure is often problematic, so contacting all patients may be justified where unacceptable delays would otherwise occur
- If the health care worker voluntarily identifies himself or herself this may help to reassure both patients and the public and reduce the number of inappropriate calls to the helpline
- Late diagnosis of HIV infection in health care workers is common, so greater steps must be taken to encourage earlier voluntary testing of those at highest risk

Computerised record systems have not been adopted universally. Manually reviewing case notes is time consuming, especially in high volume specialties and in multiple health care settings. It may be impossible to link the health care worker to individual cases, and, although some procedures have been identified as "high risk" on the basis of their risk of transmitting hepatitis B and rates of needlestick injury,¹⁹ we do not currently possess enough information to categorise all procedures accurately.

In the second case the recommendations were adhered to and letters were not sent to patients until obstetric procedures could be classified, and that delay might have accounted in part for the higher numbers of inappropriate calls to the helpline. In contrast, the third incident team sent letters to all patients operated on as it was thought unlikely that the degree of anxiety suffered would relate to the type of procedure undergone.

Typically patients are sent letters by the hospital or health authority. This method was, however, recently criticised in a court ruling as risking "psychiatric injury" to vulnerable patients, and personal visits by general practitioners were advocated instead (unreported judgment by Mr Justice French in *A and B and Others v Tameside and Glossop and Salford and Trafford Health Authorities*, 31 January 1995). This might, however, place a considerable workload on individual doctors, and a simultaneous and consistent approach would be impossible.

Communication through the media is quick, easy, and cheap; but if it is not supported by letters the message may not reach many patients. Use of the media may cause anxiety among other members of the public, and newspaper advertising is an impersonal and inappropriate means of conveying sensitive information. In a recent survey both patients and general practitioners considered hospital letters to be the most appropriate method.¹⁰

Some might argue that any attempt to contact patients is unjustified. Case finding often yields little useful epidemiological data because the numbers of HIV tests performed are too few to enable complete case ascertainment. In the cases reported only 5% of patients contacted underwent tests. Also, the low risk of transmission to patients is an argument against contacting patients or restricting an infected doctor's clinical duties on public health grounds. Failure to take such action at times when media coverage is often intense, however, may lead to accusations of a cover up and further enhance public fears. Conversely, over-reaction may compound public misconceptions of the level of risk.

CONFIDENTIALITY AND PRIVACY

The decision by the third doctor to identify himself voluntarily helped to allay anxiety among other doctors' patients. There were fewer inappropriate calls to the helpline, and the media and public responded positively to both the disclosure and his return to work. This may encourage voluntary disclosure in future incidents, but many will still prefer to remain anonymous. Health care workers are entitled to the same confidentiality as other patients. Some professional details will, however, inevitably be disclosed in the process of case finding and this may help journalists to identify the doctor. In such situations the incident team has a duty to help protect the health care worker from unsolicited media attention.

TESTING OF HEALTH CARE WORKERS

Health care workers are currently required to consult an occupational health physician if they possess risk factors which predispose to HIV infection. This approach may be inadequate, however, since all three

doctors were diagnosed only after they developed late HIV related diseases. Incidents of this type are inevitably followed by calls for compulsory testing of all health care workers. The logistic and financial implications of this are prohibitive, and the low risk of transmission to patients is a strong argument against compulsory testing. Health care workers are at a much higher risk from infected patients—who are not subjected to compulsory testing.¹¹ Also, because of the delay in developing antibodies and the time elapsing between tests, patients may still be managed by infected staff.

Alternative methods should be devised to encourage responsible action by health care workers performing exposure prone procedures. Contracts of employment might require employees to seek counselling if they possess lifestyle or health experiences which suggest an increased risk of HIV infection. Lessons can be learnt on how best to manage such incidents, but prevention remains the most desirable option.

- 1 Bell DM, Martone WJ, Culver DH, Margolis HS, Shapiro CN, Tokars JL, et al. Risk of endemic HIV and hepatitis B virus transmission to patients during invasive procedures. *Abstracts of VII International Conference on AIDS*. Florence: Istituto Superiore di Sanita, 1991.
- 2 Centers for Disease Control. Possible transmission of human immunodeficiency virus to a patient during an invasive dental procedure. *MMWR* 1990;39: 489-93.
- 3 Ciesielski C, Marianos D, Ou CY, Dumbaugh R, Witte J, Berkelman R, et al. Transmission of human immunodeficiency virus in a dental practice. *Ann Intern Med* 1992;116:798-805.
- 4 UK Departments of Health. *AIDS-HIV infected health care workers: guidance on the management of infected health care workers*. Edinburgh: Scottish Office Home and Health Department, 1993.
- 5 UK Departments of Health. *AIDS-HIV infected health care workers: practical guidance on notifying patients. Recommendations of the Expert Advisory Group on AIDS*. Edinburgh: Scottish Office Home and Health Department, 1993.
- 6 Christie P. *HIV-infected healthcare worker incident, May 1993. Report and Recommendations*. Glasgow: Scottish Centre for Infection and Environmental Health, 1994.
- 7 Pell JP, Gruer L, Goldberg D. *HIV-infected health care worker incident. December 1994. Report and recommendations*. Glasgow: Greater Glasgow Health Board, 1994.
- 8 Stark C, Christie P, Marr AC. How to do it: run an emergency helpline. *Br Med J* 1994;309:44-5.
- 9 Marcus R, the CDC Cooperative Needlestick Surveillance Group. Surveillance of health care workers exposed to blood from patients infected with the human immunodeficiency virus. *N Engl J Med* 1983;319:1118-23.
- 10 Pell JP, Gruer L. HIV-infected healthcare workers: results from a straw poll. *Lancet* 1995;346:1425.
- 11 Heptonstall J, Porter K, Gill ON. *Occupational transmission of HIV—summary of published reports*. London: Communicable Diseases Surveillance Centre, 1995.

(Accepted 29 February 1996)

Commentary: The government has mismanaged cases of HIV infected health care workers

Cris Swinhoe

Pell and colleagues' account of their three cases raises several issues: firstly, the risk to patients; secondly, the management of a case of a health care worker becoming infected; and, thirdly, the duty of a health care worker whose lifestyle puts himself or herself at risk of HIV infection.

Quantifying the risk to patients of treatment by an infected health care worker is impossible, but common sense suggests that it is close to zero. This suggests that no action should be taken when a health care worker is found to be HIV positive. Nevertheless, the failure of the chief medical officer to state this has rendered such a stance impossible. Instead incident teams and helplines have fuelled the belief of the media and the public that there is a risk. Indeed, if a patient who was treated by an infected health care worker requests testing and is found to be HIV positive, the